

Appendix B

SUPPLEMENTAL AIR QUALITY INFORMATION

SUPPLEMENTAL AIR QUALITY INFORMATION

Laws, Ordinances, Regulations, and Standards

The following section provides a more inclusive summary of Federal, State, and local laws, regulations, and standards that govern activities that could affect air quality resources across the air quality analysis area. This section is meant to supplement the discussion included in the air quality section of chapter 3.

Federal

PREVENTION OF SIGNIFICANT DETERIORATION AND CLASS I AND II AREAS

The maximum allowable PSD increments over baseline, significant impact levels (SILs), and monitoring de minimis concentrations are summarized in table B-1.

Table B-1. Prevention of Significant Deterioration of Air Quality Increments, Significant Impact Levels, and Monitoring of de Minimis Concentrations

Pollutant	Averaging Time	PSD Increments Class I ($\mu\text{g}/\text{m}^3$)	PSD Increments Class II ($\mu\text{g}/\text{m}^3$)	SILs Class I ($\mu\text{g}/\text{m}^3$)	SILs Class II ($\mu\text{g}/\text{m}^3$)	Monitoring de Minimis Concentrations ($\mu\text{g}/\text{m}^3$)
PM ₁₀	Annual	4	17	0.16	1	NA
	24-hour	8	30	0.32	5	10
SO ₂	Annual	2	20	0.08	1	NA
	24-hour	5	91	0.2	5	13
	3-hour	25	512	1	25	NA
NO ₂	Annual	2.5	25	0.1	1	14
CO	8-hour	NA	NA	NA	500	575
	1-hour	NA	NA	NA	2,000	NA

Sources: 40 CFR 52.21(c), 61 *Federal Register* 38249, 40 CFR 51.165(b)(2), 40 CFR 52.21(i)(5)(i).

Notes: NA = Not applicable; $\mu\text{g}/\text{m}^3$ = micrograms per cubic meter.

In 1999, the EPA announced an effort to improve air quality and visibility in 156 national parks and wilderness areas designated as Class I, known as the Regional Haze Rule (EPA 1999). Regional haze reduces long-range visibility over a wide region. Section 169A of the CAA sets forth a national goal for visibility. States are required by the rule to demonstrate reasonable progress towards the “prevention of any future, and the remedying of any existing, impairment in Class I areas which impairment results from manmade air pollution.”

State and Local Regulations

DOÑA ANA COUNTY

A countywide ordinance (Ordinance 194-2000 on Erosion Control Regulations (Doña Ana County 2000)) would apply to the proposed Project and alternatives and requires an erosion control plan approved by the County planning director to minimize the creation or aggravation of erosive forces. Erosion control measures must be detailed in the plan and include short-term (during construction) and long-term (during

operations) control measures as specified in the ordinance. Short-term control measures include regularly scheduled wet suppression, dust suppressants applied in amounts and rates recommended by the manufacturer and maintained as recommended by the manufacturer, upwind temporary windbreaks, starting of construction upwind and stabilizing of disturbed areas before disturbing additional areas, and/or stopping of active operations during high wind periods. Long-term control measures include site stabilization using dust suppressants applied in amounts and rates recommended by the manufacturer and maintained as recommended by the manufacturer, reseeding using native grasses, xeriscaping, tree planting, and/or permanent perimeter and interior fencing.

LUNA COUNTY

A countywide ordinance (Ordinance 75 on Buildings (Luna County 2010)) applies to the proposed Project and alternatives and requires a plan approved by the officer to prevent soil, sand, dust, building materials, construction waste, and other materials from being blown by the wind from the land.

COCHISE COUNTY

In Cochise County, no additional County-specific air quality regulations apply. A countywide ordinance (Ordinance 00-030 on Land Clearing (Cochise County 2000)) associated with a permitting program applies to the proposed Project and alternatives. Any activity that includes the clearing of more than 1 acre of land is required to have a clearing permit from the County. Controls during construction include dust and erosion control measures during clearing and until revegetation or stabilization has taken place. Dust shall be minimized through the application of generally acceptable dust suppressants and erosion shall be minimized through the application of acceptable BMPs. There are no concrete batch plant specific regulations that apply to Cochise County.

PIMA COUNTY

Pima County has been delegated authority pursuant to ARS 49-402 and ARS 49-112 to maintain and operate an air quality control program under a state implementation plan (SIP). The air quality regulations in Pima County are codified in the Pima County Air Quality Control District Code of Regulations, Title 17, Air Quality Control (Pima County 2013). The Pima County air quality standards are the same as the NAAQS established by the EPA. Specific permitting and emission limitations regulations apply for Class I areas and nonattainment areas.

The County has dust control regulations associated with a permitting program. A fugitive dust activity permit is required when conducting land stripping and/or earth moving over 1 acre, trenching over 300 feet, road construction over 50 feet, and blasting activities. A visible standard of 20 percent applies to opacity emissions from a nonpoint source. Until the area becomes permanently stabilized, dust controls during construction and operations are required. Those dust control methods include applying adequate amount of a dust suppressant to the affected area.

PINAL COUNTY

The air quality regulations in Pinal County are codified in the Pinal County Air Quality Control District Code of Regulations. The Pinal County air quality standards are similar to the NAAQS established by the EPA. The County also has dust control regulations, associated with a permitting program (Pinal County 2010). A dust registration is required when conducting land stripping and/or earth moving over 0.1 acre. A visible standard of 20 percent applies to opacity emissions. Controls during construction include watering, dust suppressants, wind barriers, covering haul vehicles, reducing speed limits, applying a gravel pad, dislodging debris from trucks prior to leaving the work site, shelter storage piles, altering loading procedures, or other applicable means.

Climate and Meteorology

The following section provides a more inclusive summary of the climate and meteorology across the air quality analysis area. This section is meant to supplement the discussion included in the air quality section of chapter 3.

New Mexico

During the summer months, individual daytime temperatures quite often exceed 100 °F at elevations below 5,000 feet, but the average monthly maximum temperatures in July, the warmest month, range from slightly above 90 °F at lower elevations to the upper 70s at high elevations. Warmest days quite often occur in June before the thunderstorm season sets in. In July and August, afternoon convective storms tend to decrease solar insolation, lowering temperatures before they reach their potential daily high. The highest temperatures of record in New Mexico are 116 °F at Orogrande on July 14, 1934, and at Artesia on June 29, 1918. A preponderance of clear skies and low relative humidity permit rapid cooling by radiation from the earth after sundown. Consequently, nights are usually comfortable in summer. The average range between daily high and low temperatures is from 25 °F to 35 °F.

In January, the coldest month, average daytime temperatures range from the middle 50s in the southern and central valleys to the middle 30s in the higher elevations of the north. Minimum temperatures below freezing are common in all sections of the state during the winter, but subzero temperatures are rare except in the mountains. The lowest temperature recorded at regular observing stations in the state was –50 °F at Gavilan on February 1, 1951. An unofficial low temperature of –57 °F at Ciniza on January 13, 1963, was widely reported by the press.

The freeze-free season ranges from more than 200 days in the southern valleys to less than 80 days in the northern mountains, where some high mountain valleys have freeze in summer months.

Average annual precipitation ranges from less than 10 inches over much of the southern desert and the Rio Grande and San Juan Valleys to more than 20 inches at higher elevations in the State. A wide variation in annual totals is characteristic of arid and semiarid climates, as illustrated by annual extremes of 2.95 and 33.94 inches at Carlsbad over a period of more than 71 years.

Summer rains fall almost entirely during brief, but frequently intense thunderstorms. The general southeasterly circulation from the Gulf of Mexico brings moisture for these storms into the State, and strong surface heating combined with orographic lifting as the air moves over higher terrain causes air currents and condensations. July and August are the rainiest months over most of the state, with from 30 to 40 percent of the year's total moisture falling at that time. The San Juan Valley area is least affected by this summer circulation, receiving about 25 percent of its annual rainfall in July and August. During the warmest 6 months of the year, May through October, total precipitation averages from 60 percent of the annual total in the Northwestern Plateau to 80 percent of the annual total in the eastern plains.

Winter precipitation is caused mainly by frontal activity associated with the general movement of Pacific Ocean storms across the country from west to east. As these storms move inland, much of the moisture is precipitated over the coastal and inland mountain ranges of California, Nevada, Arizona, and Utah. Much of the remaining moisture falls on the western slope of the Continental Divide and over northern and high central mountain ranges. Winter is the driest season in New Mexico except for the portion west of the Continental Divide. This dryness is most noticeable in the Central Valley and on eastern slopes of the mountains.

Much of the winter precipitation falls as snow in the mountain areas, but it may occur as either rain or snow in the valleys. Average annual snowfall ranges from about 3 inches at the Southern Desert and Southeastern Plains stations to well over 100 inches at Northern Mountain stations. It may exceed 300 inches in the highest mountains of the north.

Plentiful sunshine occurs in New Mexico, with from 75 to 80 percent of the possible sunshine being received. In winter, this is particularly noticeable with from 70 to 75 percent of the possible sunshine being received. It is not uncommon for as much as 90 percent of the possible sunshine to occur in November and in some of the spring months. The average number of hours of annual sunshine ranges from near 3,700 hours in the southwest to 2,800 in the north-central portions.

Average relative humidity is lower in the valleys but higher in the mountains because of the lower mountain temperatures. Relative humidity ranges from an average of near 65 percent around sunrise to near 30 percent in mid-afternoon; however, afternoon humidity in warmer months is often less than 20 percent and occasionally may go as low as 4 percent. The low relative humidity during periods of extreme temperatures eases the effect of summer and winter temperatures.

Wind speeds over the State are usually moderate, although relatively strong winds often accompany occasional frontal activity during late winter and spring months and sometimes occur just in advance of thunderstorms. Frontal winds may exceed 30 miles per hour (mph) for several hours and reach peak speeds of more than 50 mph. Spring is the windy season. Blowing dust and serious soil erosion of unprotected fields may be a problem during dry spells. Winds are generally stronger in the eastern plains than in other parts of the State. Winds generally predominate from the southeast in summer and from the west in winter, but local surface wind directions will vary greatly because of local topography and mountain and valley breezes.

Potential evaporation in New Mexico is much greater than average annual precipitation. Evaporation from a Class A pan ranges from near 56 inches in the north-central mountains to more than 110 inches in southeastern valleys. During the warm months, May through October, evaporation ranges from near 41 inches in the north-central to 73 inches in the southeast portions of the State.

Table B-2 presents climate data for Lordsburg and Las Cruces, New Mexico.

Table B-2. Climate Conditions in the New Mexico Proposed Project and Alternatives Area

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Lordsburg, New Mexico ^a													
Average max. temperature (°F)	59.1	63.5	70.4	79.1	87.7	96.8	96.8	94.2	89.5	79.9	67.6	58.6	78.6
Average min. temperature (°F)	25.5	28	33.2	39.6	47.8	58.1	64.6	62.9	56.2	43.6	31.6	25.5	43.1
Average total precipitation (inches)	0.81	0.71	0.63	0.27	0.23	0.42	1.87	1.94	1.22	0.93	0.59	0.88	10.49
Average total snowfall (inches)	1.2	1	0.6	0.1	0	0	0	0	0	0	0.3	1.3	4.5

Table B-2. Climate Conditions in the New Mexico Proposed Project and Alternatives Area (Continued)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Las Cruces, New Mexico ^b													
Average max. Temperature (°F)	59.7	64.3	71.1	80.1	87.3	96.5	95.4	94.7	91.1	81.4	67.8	59.2	79.1
Average min. temperature (°F)	28.7	29.5	36.7	45.1	51.5	61.8	66.9	65.5	58.3	46.8	33.3	28.4	46.1
Average total precipitation (inches)	0.49	0.41	0.17	0.12	0.25	0.5	1.12	1.16	0.68	0.91	0.19	0.4	6.39
Average total snowfall (inches)	1.6	1.5	0	0.1	0	0	0	0	0	0	0	0.8	3.9

Notes:

Avg. = average

Max. = maximum

Min. = minimum

^a Source: Western Regional Climate Center, 2011a, Station ID 295079.

^b Source: Western Regional Climate Center, 2011b, Station ID 294799.

Arizona

Cold air masses from Canada sometimes penetrate into the State, bringing temperatures well below zero in the high plateau and mountainous regions of central and northern Arizona. The lowest readings can dip to 35 °F below zero. High temperatures are common throughout the summer months at the lower elevations. Temperatures higher than 125 °F have been observed in the desert area. Great extremes occur between day and night temperatures throughout Arizona. The daily range between minimum and maximum temperatures sometimes runs as much as 50 °F to 60 °F during the drier portions of the year. During winter months, daytime temperatures may average 70 °F, with night temperatures often falling to freezing or slightly below in the lower desert valleys. In the summer, the pine-clad forests in the central part of the State may have afternoon temperatures of 80 °F, while night temperatures drop to 35 °F or 40 °F.

Precipitation throughout Arizona is governed to a great extent by elevation and the season of the year. From November through March, storm systems from the Pacific Ocean cross the State. These winter storms occur frequently in the higher mountains of the central and northern parts of the State and sometimes bring heavy snows. Snow accumulation may reach depths of 100 inches or more during the winter. The gradual melting of this snow during the spring serves to maintain a supply of water in the main rivers of the State. Reservoirs on these streams supply water to the desert areas in the lower Salt River valley and the lower Gila River valley areas, which are extensively farmed.

Summer rainfall begins early in July and usually lasts until mid-September. Moisture-bearing winds sweep into Arizona from the southeast, with their source region in the Gulf of Mexico. Another important source of moisture for southern Arizona is the Gulf of California. Summer rains occur in the form of thunderstorms, which result largely from excessive heating of the ground and the lifting of moisture-laden air along main mountain ranges. Thus, the heaviest thunderstorms are usually found in mountainous regions of the central and southeastern portions of Arizona. These thunderstorms are often accompanied by strong winds and brief periods of blowing dust prior to the onset of rain. Hail occurs rather infrequently.

The average number of days with measurable precipitation per year varies from near 70 days in the Flagstaff area to 15 at Yuma. A large portion of Arizona is classed as semiarid and long periods often occur with little or no precipitation. The air is generally dry and clear, with low relative humidity and a high percentage of sunshine. April, May, and June are the months with the greatest number of clear days, while July and August, as well as December, January, and February have the cloudiest weather and lowest percent of possible sunshine. Humidity, while low compared with most other States, are higher throughout much of Arizona during July and August, which is the thunderstorm season. Annual average humidity values, based on four readings per day, range from 55 percent at Flagstaff to around 33 percent at Yuma. Yearly averages of percent of possible sunshine range from 86 to 92 percent. Evaporation rates in Arizona are high because of high temperatures, the dryness of the air, and the high percentage of sunshine. Mean annual lake evaporation varies from about 80 inches in the southwestern part of the State to about 50 inches in the northeast. Phoenix averages about 72 inches and Tucson 70 inches per year.

Table B-3 presents climate data for Tucson and Benson, Arizona.

Table B-3. Climate Conditions in the Arizona Proposed Project and Alternatives Area

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Tucson, Arizona^a													
Avg. max. temperature (°F)	64.9	68.3	73.5	81.7	90.5	99.7	99.4	97.2	94.4	84.9	73.2	65.2	82.7
Avg. min. temperature (°F)	38.7	41.1	44.9	50.9	58.7	68.1	74	72.5	67.8	56.9	45.5	39	54.8
Avg. total precipitation (inches)	0.85	0.79	0.69	0.32	0.22	0.27	2.34	2.23	1.32	0.82	0.65	0.96	11.44
Avg. total snowfall (inches)	0.3	0.2	0.2	0	0	0	0	0	0	0	0.1	0.2	1
Benson, Arizona^b													
Average max. temperature (°F)	63	66.4	72.3	79.2	87.8	96.6	96.4	93.5	91.1	83	71.7	63.1	80.3
Average min. temperature (°F)	28.8	32	36.6	42.1	49.1	58.5	65.7	64.1	57.1	44.8	34.1	29.7	45.2
Average total precipitation (inches)	0.68	0.74	0.51	0.23	0.1	0.37	2.69	2.79	1.32	0.62	0.57	0.71	11.34
Average total snowfall (inches)	0.6	0.6	0.1	0	0	0	0	0	0	0	0.1	0.4	1.8

Notes:

Avg. = average

Max. = maximum

Min. = minimum

^a Source: Western Regional Climate Center, 2011c, Station ID 028820.

^b Source: Western Regional Climate Center, 2011d, Station ID 020680.

Background Air Quality

The following section presents the background air quality monitoring data from the nearest monitoring stations to the proposed Project and alternatives. This section is meant to supplement the discussion included in the air quality section of chapter 3.

New Mexico

Table B-4 presents background air quality monitoring data from local monitoring stations in New Mexico within or near the air quality analysis area. These monitors report ambient concentrations of CO, NO₂, SO₂, O₃, and PM₁₀. The data presented in table B-4 are not directly comparable to the NAAQS and/or NMAAQs, but can be used to demonstrate general background air quality.

As discussed, the proposed Project and alternatives pass near the nonattainment area for PM₁₀ next to the city of Anthony in Doña Ana County. The nearest monitors for PM₁₀ to the proposed Project and alternatives in Doña Ana County (Anthony and Sunland Park) indicate first maximums of 148 to 149 µg/m³ for the 24-hour PM₁₀ standard, as shown in table B-4. Additionally, even though Doña Ana County has been recommended for nonattainment status for O₃, the first maximum values at the nearest monitoring locations to the proposed Project and alternatives within Doña Ana County were 0.070 to 0.071. The prevailing winds near the PM₁₀ nonattainment area blow from the east. Additionally, Grant County was identified as a maintenance area for SO₂. However, the nearest monitoring locations to the proposed Project and alternatives did not reveal high levels of SO₂, as shown in table B-4. The prevailing winds near the SO₂ maintenance area blow from the west (WRCC 2015).

Table B-4. New Mexico Background Air Quality Monitoring Data

Pollutant	Averaging Period	First Maximum	Second Maximum	Average	Year	Location
NO ₂	1-hour	51 ppb	43 ppb	–	2014	Santa Teresa (Doña Ana County)
	Annual	–	–	0.013 ppm		
O ₃	8-hour	0.071 ppm	0.068 ppm	–	2014	Las Cruces (Doña Ana County)
O ₃	8-hour	0.070 ppm	0.069 ppm	–	2014	Santa Teresa (Doña Ana County)
PM ₁₀	24-hour	149 µg/m ³	130 µg/m ³	–	2014	Anthony (Doña Ana County)
	Annual	–	–	37.3 µg/m ³		
PM ₁₀	24-hour	148 µg/m ³	122 µg/m ³	–	2014	Sunland Park (Doña Ana County)
	Annual	–	–	32.6 µg/m ³		
PM ₁₀	24-hour	141 µg/m ³	123 µg/m ³	–	2014	Las Cruces (Doña Ana County)
	Annual	–	–	19.3 µg/m ³		
NO ₂	1-hour	35 ppb	32 ppb	–	2014	Deming (Luna County)
	Annual	–	–	0.011 ppm		
O ₃	8-hour	0.065 ppm	0.061 ppm	–	2014	Deming (Luna County)
PM ₁₀	24-hour	141 µg/m ³	131 µg/m ³	–	2014	Deming (Luna County)
	Annual	–	–	24.1 µg/m ³		
O ₃	8-hour	0.067 ppm	0.067 ppm	–	2014	Hurley (Grant County)
PM ₁₀	24-hour	50 µg/m ³	41 µg/m ³	–	2014	Hurley (Grant County)
	Annual	–	–	16.6 µg/m ³		

Table B-4. New Mexico Background Air Quality Monitoring Data (Continued)

Pollutant	Averaging Period	First Maximum	Second Maximum	Average	Year	Location
SO ₂	1-hour	4 ppb	1 ppb	–	2014	Hurley (Grant County)
	3-hour	0.002 ppm	0.0003 ppm	–		
	24-hour	0.0002 ppm	0 ppm	–		
	Annual	–	–	0.00002 ppm		

Source: EPA (2012).

Notes:

µg/m³ = micrograms per cubic meter.

ppb = parts per billion.

Arizona

Table B-5 presents background air quality monitoring data from local monitoring stations in Arizona within or near the air quality analysis area. These monitors report ambient concentrations of CO, NO₂, SO₂, O₃, PM₁₀ and PM_{2.5}. The data presented in table B-5 are not directly comparable to the NAAQS but can be used to demonstrate general background air quality.

As discussed, the proposed Project and alternatives pass near nonattainment and maintenance areas for PM₁₀ and SO₂, respectively, in Cochise County. Three exceedances of the PM₁₀ level were recorded in the nonattainment area near Douglas, Arizona during 2014. The prevailing winds near the nonattainment and maintenance areas in Cochise County blow from the southwest. The data either demonstrated compliance (via 2014 Pima County monitoring station data) or no data were collected (no monitoring locations near the proposed Project or alternatives in Cochise County) with respect to attainment/nonattainment of the NAAQS for SO₂.

Portions of the proposed Project and alternatives would cross the Tucson CO maintenance area located in Pima County and the San Manuel nonattainment PM₁₀ maintenance area located in Pinal County. As shown in table B-5, monitoring locations nearest the proposed Project and alternatives in these Counties identified low concentrations of these pollutants in 2014. First maximum concentrations of O₃ in Tucson and Casa Grande were 0.076 and 0.077, respectively, during 2014. The prevailing winds near the nonattainment and maintenance areas blow from the southwest.

Table B-5. Arizona Background Air Quality Monitoring Data

Pollutant	Averaging Period	First Maximum	Second Maximum	Average	Year	Location
O ₃	8-hour	0.074 ppm	0.072 ppm	–	2014	Chiricahua National Monument/Cochise County
PM _{2.5}	24-hour	26 µg/m ³	25 µg/m ³	–	2014	Douglas Red Cross/Cochise County
	Annual	–	–	7.4 µg/m ³		
PM ₁₀	24-hour	197 µg/m ³	175 µg/m ³	–	2014	Douglas Red Cross/Cochise County
	Annual	–	–	38.7 µg/m ³		

Table B-5. Arizona Background Air Quality Monitoring Data (Continued)

Pollutant	Averaging Period	First Maximum	Second Maximum	Average	Year	Location
CO	1-hour	1.9 ppm	–	–	2014	Tucson/Pima County
	8-hour	0.9 ppm	0.9 ppm	–		
NO _x	1-hour	47.6 ppb	47.1 ppb	–	2014	Tucson/Pima County
	Annual	–	–	0.023 ppm		
O ₃	8-hour	0.066 ppm	0.065 ppm	–	2014	Tucson/Pima County
O ₃	8-hour	0.077 ppm	0.067 ppm	–	2014	Tucson/Pima County
PM ₁₀	24-hour	82 µg/m ³	57 µg/m ³	–	2014	Corona de Tucson/Pima County
	Annual	–	–	16.7 µg/m ³		
PM ₁₀	24-hour	134 µg/m ³	122 µg/m ³	–	2014	Ajo/Tucson/Pima County
	Annual	–	–	27.7 µg/m ³		
SO ₂	1-hour	9.6 ppb	7.7 ppb	–	2014	Tucson/Pima County
	3-hour	0.005 ppm	0.005 ppm	–		
	24-hour	0.001 ppm	0.001 ppm	–		
	Annual	–	–	0.001 ppm		
O ₃	8-hour	0.076 ppm	0.066 ppm	–	2014	Casa Grande Airport/ Pinal County
PM ₁₀	24-hour	133 µg/m ³	123 µg/m ³	–	2014	Casa Grande/Pinal County
	Annual	–	–	38.3 µg/m ³		

Analysis Assumptions

The following section provides a more inclusive summary of the assumptions regarding the calculation of Project and alternatives' emission inventories. This section is meant to supplement the discussion included in the air quality section of chapter 4.

Emission Inventories

Emissions were calculated to estimate ambient air impacts from construction and, where appropriate, operation of the transmission lines, substation, and ancillary equipment associated with the Project. Emission inventories were developed using published and agency-accepted values, such as from emission factors from AP-42, MOBILE6.2, and NONROAD. PM₁₀ and PM_{2.5} emissions were quantified for fugitive dust from earth-moving and construction activities that would be associated with construction of the transmission line and substations, including fugitive dust from concrete batch plant construction and operation; fugitive dust from vehicles traveling on paved and unpaved roads accessing various segments of the line route during construction; criteria air pollutants, HAPs, and GHGs resulting from engine exhaust from worker commutes, delivery trucks, and construction equipment during construction; and SF₆ emissions from operation of the gas-insulated circuit breakers in the switchyards.

With the exception of SF₆ emissions from the circuit breakers, Project operational emissions were not quantified. The primary emission sources associated with the operations phase of the transmission lines would include windblown dust from ground disturbance, road dust, and vehicle emissions during periodic maintenance or emergency repair activities. Emission sources would be similar to those from construction activities, but, on an annualized basis, pollutants would be emitted in much smaller amounts. Therefore,

the majority of emissions and potential air quality impacts would be associated with the construction of the transmission lines and substations.

MOBILE6.2 was run assuming that construction would take place in 2015 and 2016. The year affects the MOBILE6.2 emission factors used to estimate the engine exhaust from worker commute vehicles, trucks transporting construction equipment, and concrete delivery vehicles, and the NONROAD emission factors were used to estimate the engine exhaust from construction equipment for substation construction, transmission line construction, and concrete batch plant construction. Later years have lower average emission factors owing to increasingly stringent engine emission requirements, generally resulting in lower emissions from newer vehicles. Over time, the older vehicles with higher emissions in the fleet are replaced with newer vehicles with lower emissions, leading to a decrease in the average fleet emissions. Should Project construction activities continue beyond 2016, then vehicle exhaust emission estimates presented herein would be conservative.

Fugitive Dust from Transmission Line, Substation, Access Road, Construction Yard, and Concrete Batch Plant Construction

AP-42 emission factors were used to estimate the fugitive dust from soil-disturbing construction activities such as excavation for lattice structure foundations, grading for access road construction, and grading for creation of temporary construction yards, substations, and concrete batch plants. The following data were provided, or assumptions were made, for calculation of fugitive dust emissions from grading and earth-moving associated with the construction of transmission lines, substations, access roads, temporary construction yards, and batch plants:

- Estimates of disturbance area, number of disturbed sites, and anticipated workforce for construction of transmission lines, substations, access roads, and batch plants were taken from the “Amended Plan of Development for the Southline Transmission Project” (Southline POD; July 2013), as described in chapter 2.
- Constructed access roads were not assumed to be graveled or paved (Southline POD, July 2013).
- Driving surfaces less than 14 feet wide would be widened to 14 feet (Southline POD, July 2013). Therefore, these calculations assumed that construction or improvement of access roads would require grading to a width of 14 feet.
- Emission estimates assumed that the access roads, substations, and temporary construction yards would be graded to a depth of 8 inches.
- Emission estimates assumed that excavation would not be required at substations, concrete batch plants, or temporary construction yards.
- Emission estimates assumed routine watering during construction of the transmission line, substations, concrete batch plants, access roads, and temporary construction yards.

Fugitive Dust from Travel on Paved and Unpaved Roadways

AP-42 emission factors were used to estimate the fugitive dust from travel on paved and unpaved roads. The following data were provided, or assumptions were made, for calculation of construction and operation emissions:

- Emission estimates assumed that unpaved roads would be dirt, not gravel.
- Emission estimates assumed that unpaved road travel would consist of the miles traveled on access roads, as discussed in chapter 2.

- Emission estimates assumed routine watering for travel on paved and unpaved roads during construction.

Traffic Emissions

MOBILE6.2 emission factors were used to estimate the engine exhaust from worker commute vehicles, trucks transporting construction equipment, and concrete delivery vehicles. The MOBILE6.2 emission factors for commuter vehicles are based on an average of the commuter vehicle emission factors for each county in the year 2013. The MOBILE6.2 emission factors for trucks transporting construction equipment and concrete delivery vehicles are based on emission factors for 2013, which are the same for all the Counties and both States. MOBILE6.2 includes an emission factor for CO₂ to obtain GHG emissions for these activities and an emission factor for HAPs as well.

The following data were provided, or assumptions were made, for calculation of construction and operation emissions:

- It is expected that the average commute would be about 20 miles for nonlocals and about 30 miles for locals (Southline POD, July 2013), as discussed in chapter 2:
 - The average commuting trip was therefore assumed to be 25 miles one-way (50 miles round trip).
 - This mileage was used to calculate engine exhaust for travel to construct the substation and transmission line and travel on paved roads. It was assumed that paved road travel would consist of worker commuters, trucks transporting construction equipment, and trucks delivering concrete.
- The New Build and Upgrade Sections average number of commuter trips for substation construction were calculated by multiplying the New Build and Upgrade Sections average number of workers by the New Build and Upgrade Sections average crew days.
- The New Build Section total number of commuter miles for substation construction was calculated by multiplying the New Build Section average number of commuter trips by the average number of miles per round trip commute.
- A weighted average of light-duty gas vehicles and light-duty gas trucks 1 and 2 with average speed of 35 mph was used for engine exhaust from commuter vehicles. (Light-duty gas trucks 1 are 0 to 6,000 pounds gross vehicle weight rating (GVWR) and 0 to 3,750 pounds loaded vehicle weight (LVW), and light-duty gasoline trucks 2 are 0 to 6,000 pounds GVWR and 3,751 to 5,750 pounds LVW.) For fugitive dust from paved road travel, the worker commute vehicle was assumed to be 6,800 pounds (including occupants and cargo).
- An average of 25 miles, or 50 miles round trip, was assumed for transporting construction equipment; this mileage was used for engine exhaust for trucks transporting construction equipment for both substation and transmission line construction and for travel on paved roads. It was assumed that paved road travel would consist of worker commuters, trucks transporting construction equipment, and trucks delivering concrete.
- The New Build Section total number of miles traveled for trucks transporting construction equipment for substation construction assumed that four substations would be needed for the New Build Section.
- The Upgrade Section total number of miles traveled for trucks transporting equipment for substation construction assumed that 11 substations would be needed for the Upgrade Section, as discussed in chapter 2.

- As discussed in chapter 2, heavy-duty diesel vehicles with an average speed of 35 mph were assumed for calculating emissions from trucks transporting construction equipment and trucks delivering concrete. For fugitive dust from paved road travel, trucks transporting construction equipment and trucks delivering concrete were assumed to be 40,000 pounds, which includes weight of cab, trailer, and load
- The total number of miles traveled for transmission line construction in the New Build and Upgrade Sections was based on the assumption that the equipment would be delivered once and travel the length of the line.
- The total commuter trips and miles traveled per New Build Section and Upgrade Section mile were calculated by averaging the crew size (workers) for the New Build and Upgrade Sections provided in the Southline POD (July 2013).

Construction Equipment Emissions

NONROAD emission factors were used to estimate the engine exhaust from diesel-fired construction equipment for substation construction, transmission line construction, and concrete batch plant construction. Two sets of NONROAD emission factors were developed for the year 2013—one for Arizona and one for New Mexico, as minimal variation in fuel blends exist between the States. The NONROAD total hydrocarbon emission factor was used for the volatile organic compound (VOC) emission factor. NONROAD includes an emission factor for CO₂ to obtain estimates of GHG emissions for these activities.

The following data were provided, or assumptions were made, for calculation of emissions from the operation of construction equipment:

- The types of construction equipment required for substation equipment installation and foundations and transmission line construction were taken from the Southline POD (July 2013), and are described in chapter 2.
- The total hours of equipment use and horsepower for substation equipment installation and foundations and transmission line construction provided in the Southline POD (July 2013) were summed for each piece of construction equipment.

Concrete Batch Plant Operation Emissions

AP-42 emission factors were used to estimate the fugitive dust from operation of the concrete batch plants. The following data were provided, or assumptions were made, for calculating concrete batch plant operational emissions:

- The number of concrete batch plants per subroute was taken from the Southline POD (July 2013), as discussed in chapter 2.
- The number of cubic yards of concrete for substation construction and transmission line construction in the New Build and Upgrade Sections was taken from the Southline POD (July 2013), along with the typical delivery distance of approximately 7 miles (14 miles round trip).
 - This mileage was used for engine exhaust from concrete delivery trucks for both substation and transmission line construction and travel on paved roads. It was assumed that paved road travel consists of worker commuters, trucks transporting construction equipment, and trucks delivering concrete.
 - A concrete truck was assumed to carry 10 cubic yards of concrete.

- The total concrete amount for substation construction and transmission line structure foundation construction in the New Build Section was divided equally between the seven New Build Section batch plants.
- The total concrete amount for substation construction and transmission line structure foundation construction in the Upgrade Section was divided equally between the four Upgrade Section batch plants.
- Emissions from concrete batch plant operation were assumed to be uncontrolled.

Substation Operation Emissions (Greenhouse Gases)

The emission inventories include GHG estimates from circuit breakers and other high-voltage equipment used in the transmission and distribution system. The Climate Registry Electric Power Sector Protocol was used to develop these emission estimates. The EPA GHG Mandatory Reporting Rule, Subpart DD, was not used for the SF₆ emission estimates because Subpart DD relies on a mass balance in which SF₆ emissions are determined by the amount of SF₆ lost each year, which can only be calculated by measuring the added and/or recovered SF₆ to existing equipment. The Climate Registry methodology was therefore used instead to develop SF₆ emission estimates because it provides emission factors based on industry studies and thus can be applied to equipment that does not yet exist to determine estimated annual emissions.

SF₆ quantities and leakage rates for the different sizes of circuit breakers were provided in the Southline POD (July 2013). The high end of the leak rate range was used in calculations.

REFERENCES

- Cochise County. 2000. Cochise County Land Clearing Ordinance. Ordinance No. 00-030. Adopted July 17, 2000.
- Doña Ana County. 2000. Doña Ana County Erosion Control Regulations. Ordinance No. 194-2000. Effective date January 19, 2001.
- Luna County. 2010. Luna County Building Code. Ordinance Number 75. Adopted August 12, 2010.
- Pima County. 2013. Title 17, Pima County Code, Chapter 17.12. Permits and Permit Revisions. Accessed June 18, 2013.
- Pinal County. 2010b. Pinal County Air Quality Control District. Dust Control Fact Sheet. June 2010.
- Southline Transmission, LLC. 2013. Amended Plan of Development for the Southline Transmission Project. July 2013.
- U.S. Environmental Protection Agency (EPA). 1999. Regional Haze Regulations; Final Rule. FRL-6353-4 40 CFR Part 51. July 1, 1999. Available at:
http://www.epa.gov/ttn/oarpg/t1/fr_notices/rhfedreg.pdf. Accessed June 2013.
- . 2012. Climate change basics. Available at:
<http://www.epa.gov/climatechange/basics/#responsible>. Accessed June 6, 2012.
- . 2011a. Period of Record Monthly Climate Summary – Lordsburg 4 SE, New Mexico 295079.
- . 2011b. Period of Record Monthly Climate Summary – Las Cruces, New Mexico 294799.
- . 2011c. Period of Record Monthly Climate Summary – Tucson WSO AP, Arizona 028820.
- . 2011d. Period of Record Monthly Climate Summary – Benson, Arizona 020680.